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APPLICATION NO	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/043,954	01/10/2002	Warren S. Letzsch	696-254	6370

7590 06/11/2003

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EXAMINER	
LEUNG, JENNIFER A	

ART UNIT	PAPER NUMBER
1764	

DATE MAILED: 06/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

mk 5

Office Action Summary	Application No.	Applicant(s)	
	10/043,954	LETZSCH, WARREN S.	
	Examiner	Art Unit	
	Jennifer A. Leung	1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-22 is/are pending in the application.

4a) Of the above claim(s) 11-22 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-10 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) 1-22 are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2
4) ☐ Interview Summary (PTO-413) Paper No(s) _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other

DETAILED ACTION

Election/Restrictions

1. Applicant's election of Group I, claims 1-10, in Paper No. 5 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

2. Claims 11-22 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim.

Drawings and Specification

3. The disclosure is objected to because of the following informalities: On page 8, line 3, "the first diameter transition zone 22" (page 8, line 3) should be changed to -- the first diameter transition zone 20 --, as set forth on page 6, line 17. Appropriate correction is required.

4. The drawings are objected to because it is unclear as to which angle of the "first diameter transition zone 20" and the "second diameter transition zone 25" is intended by reference characters 22 and 27, respectively. The Examiner suggests designating the intended angle with a "curved angle notation" such as "∠". A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

5. The drawings and specification have not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware.

Claim Objections

6. Claim 1 is objected to because of the following informalities: -- separator -- should be inserted before "means for separating" (line 13) for consistency in claim terminology (i.e., consistency with "said separator means" in lines 16, 17-18, and 19-20). Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 1-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 1, "a first narrower riser reactor section" (line 3) and "a second wider riser reactor section" (line 6) are considered vague and indefinite, since the terms "narrower" and "wider" are relative terms. See also all subsequent uses.

Regarding claims 3 and 4, it is unclear as to which reference angle is intended by "*an angle* ranging from about 5° to about 30° " and "*said angle* ranges from about 8° to about 20° ", with respect to the other elements of the apparatus.

Regarding claim 6, it is unclear as to which reference angle is intended by, "*an angle* ranging from about 5° to about 30° ", with respect to the other elements of the apparatus.

Regarding claim 9, "the catalyst particles" (line 3) lacks proper positive antecedent basis.

Regarding claim 10, "said dense phase catalyst bed" (lines 2-3) lacks proper positive antecedent basis.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-6 and 8-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Xu et al. (EP 1 046 696).

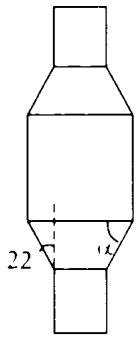
With respect to claims 1, 2 and 8, Xu et al. (FIG. 1, 2; sections [0017], [0034]) disclose an apparatus for the catalytic cracking of hydrocarbonaceous feedstocks comprising:

- A first narrower riser reactor section having a radius *x* (i.e., first reaction zone **b**, **5**), a means for feeding a hydrocarbon feedstock (i.e., feedstock conduit **4**) and a means for feeding cracking catalyst (i.e., standpipe **16**) located in a lower portion thereof;
- A second wider riser reactor section having a radius *y* (i.e., second reaction zone **c**, **7**) wherein the ratio of *y*:*x* ranges from about 1.1:1 to 5.0:1, or about 1.25:1 to 2.5:1 (i.e., "The diameter ratio of the [second reaction zone] to the [first reaction zone] is generally from about 1.5:1 to about 5:1"; see section [0025], lines 24-25) operatively connected to said first narrower riser reactor section (**b**, **5**) by a first diameter transition section (i.e., conjunct section comprising angle "α"; section [0022], lines 9-11);
- A riser product conduit (i.e., outlet zone **d**, **8**) having an inlet operatively connected to said second wider riser reactor section (**c**, **7**) by a second diameter transition section (i.e., conjunct section comprising angle "β"; section [0022], lines 11-12) and having an outlet operatively connected to a means for separating catalyst from cracked product (i.e., set of

cyclones **10**); and

- A disengager vessel (**9**) having an upper dilute phase and a lower dense phase, said upper dilute phase suitable for receiving cracked product gases and for supporting said separator means (**10**); and said lower dense phase suitable for receiving catalyst from said separator means (**10**); said disengager vessel (**9**) further comprising an outlet (i.e., conduit **11**) for removing separated cracked gases from said separator means (**10**).

With respect to claims 3-4 (as best understood), Xu et al. (FIG. 1, 2; section [0022]; lines 9-11) disclose said first diameter transition section operatively connects said first narrower reactor section (**b**, **5**) to said second wider reactor section (**c**, **7**) at an isotrapezia vertex angle α generally about 30° to 80°. Comparing FIG. 1 of Xu et al. to the Figure of the presently claimed invention, it appears that "angle α" of Xu et al. is related as complementary angle to "angle 22". Therefore, in computing the equivalent to an "angle 22", the equivalent angle in the apparatus of Xu et al. lies within the range of about 10° to 60°, and thus meets the recited claim limitation of an angle measurement lying within the ranges of about 5° to 30°, and about 8° to 20°.



EQUIVALENT ANGLE $\cong 90^{c} - \alpha$

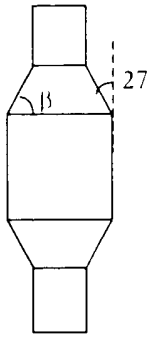
upper angle range $\cong 90^{c} - 30° \cong 60°$

lower angle range $\cong 90^{c} - 80° \cong 10°$

With respect to claim 5, Xu et al. disclose said riser product conduit (**d**, **8**) has a radius of approximately *x*, or a radius approximately equal to the diameter of the first narrower riser reactor section (**b**, **5**); (i.e., "The diameter ratio of the outlet zone to the first reaction zone is

generally about 0.8:1 to about 1.5:1"; section [0026]; FIG. 1, 2)

With respect to claim 6 (as best understood), Xu et al. (FIG. 1, 2; section [0022]; lines 11-12) disclose said second diameter transition section operatively connects said riser product conduit (**d**, **8**) to said second wider reactor section (**c**, **7**) at an isotrapezia base angle β generally about 45° to about 85°. Comparing FIG. 1 of Xu et al. to the Figure of the presently claimed invention, it appears that "angle β" of Xu et al. is related as a complementary angle to "angle 27". Therefore, in computing the equivalent to an "angle 27", the equivalent angle in the apparatus of Xu et al. lies within the range of about 5° to about 45°, and thus meets the recited claim limitation of an angle measurement of about 5° to about 30°.



EQUIVALENT ANGLE ≅ 90° − β

upper angle range ≅ 90° − 45° ≅ 45°

lower angle range ≅ 90° − 85° ≅ 5°

With respect to claim 9, Xu et al. disclose said lower dense phase of said disengager vessel (9) is equipped with means for stripping hydrocarbons from the catalyst particles (i.e., catalyst stripper **12**; stripping steam via conduit **13**; FIG. 2; section [0034]).

With respect to claim 10, Xu et al. (FIG. 2; section [0034]) disclose a regenerator vessel (i.e., regenerator **15**) comprising a means for receiving spent catalyst (i.e., spent catalyst standpipe **14**) from said dense phase catalyst bed of said disengager vessel (**9**); means for regenerating said catalyst (i.e., "... contacted with air via conduit **17** with the result that catalyst regeneration takes place to burn off coke"), and means for recycling regenerated catalyst (i.e., via

regenerated catalyst standpipe **16**) to said first narrower reactor section (**b**, **5**).

Instant claims 1-6 and 8-10 structurally read on the apparatus of Xu et al.

9. Claims 1-6 and 8-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Weinberg et al. (U.S. 5,196,172).

With respect to claims 1, 2 and 8, Weinberg et al. (FIG. 1; column 9, line 49 to column 10, line 64) disclose an apparatus for the catalytic cracking of hydrocarbonaceous feedstocks comprising:

- A first narrower riser reactor section (i.e., lift section **3**) having a radius *x*, a means for feeding a hydrocarbon feedstock (i.e., feed nozzles **4**) and a means for feeding cracking catalyst (i.e., via lines **2**, **6**) located in a lower portion thereof;
- A second wider riser reactor section (i.e., comprising vaporization zone **5** and reaction zone **8**) having a radius *y* wherein the ratio of *y*:*x* appears *by illustration* to range from about 1.1:1 to 5.0:1, or about 1.25:1 to 2.5:1 (since the diameter of zones **5**, **8** is greater than the diameter of section **3**) operatively connected to said first narrower riser reactor section (**3**) by a first diameter transition section (i.e. comprising feed injection point **4a**);
- A riser product conduit (i.e., the riser section located within stripper **12** zone) having an inlet operatively connected to said second wider riser reactor section (**5**, **8**) by a second diameter transition section (see Figure 1) and having an outlet operatively connected to a means for separating catalyst (i.e., reactor cyclone **10**) from cracked product; and
- A disengager vessel (i.e., the vessel surrounding the upper portion of the riser reactor; see Figure 1) having an upper dilute phase and a lower dense phase; said upper dilute phase suitable for receiving cracked product gases and for supporting said separator means (**10**);

and said lower dense phase suitable for receiving catalyst from said separator means; said disengager vessel further comprising an outlet (i.e., overhead transfer line **11**) for removing separated cracked gases from said separator means (**10**).

With respect to claims 3 and 4, Weinberg et al. (see FIG. 1) disclose *by illustration* said first diameter transition section (**4a**) operatively connecting said first narrower reactor section (**3**) to said second wider reactor section (**5**, **8**) at an angle which appears to range from about 5° to about 30°, or about 8° to about 20°.

With respect to claim 5, Weinberg et al. (see FIG. 1) disclose *by illustration* said riser product conduit having a radius which appears to approximate the radius *x* of the first narrower reactor section (**3**).

With respect to claim 6, Weinberg et al. (see FIG. 1) disclose *by illustration* said second diameter transition section operatively connecting said riser product conduit to said second wider reactor section (**5**, **8**) at an angle which appears to range from about 5° to about 30°.

With respect to claim 9, Weinberg et al. (FIG. 1; column 10, lines 1-26) disclose said lower dense phase of said disengager vessel is equipped with means for stripping hydrocarbons from the catalyst particles (i.e., stripper **12**; steam **13** injected via distributor **13a**).

With respect to claim 10, Weinberg et al. (FIG. 1; column 10, lines 15-64) disclose a regenerator vessel (i.e. defining fluid bed regenerator **24**) comprising a means for receiving spent catalyst (i.e., via standpipe **14**) from said dense phase catalyst bed of said disengager vessel, means for regenerating said catalyst (i.e., utilizing combustion air **17**), and means for recycling regenerated catalyst (i.e., via standpipes **27**, **28**) to said first narrower reactor section (**3**).

Instant claims 1-6 and 8-10 structurally read on the apparatus of Weinberg et al.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Xu et al. (EP 1 046 696) in view of Goelzer et al. (U.S. 5,087,349).

With respect to claim 7, Xu et al. (FIG. 2) further disclose a quench injection means (i.e., conduit **6**) for the supplying quenching mediums to the effluent flowing into the second reaction zone (**c**, **7**) via the first diameter transition zone in order to control the reaction temperature of the zone (sections [0025], [0034]). However, Xu et al. are silent as to whether said riser product conduit (**d**, **8**) may comprise a quench injection means. In any event, it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to provide a quench injection means to the riser product conduit in the apparatus of Xu et al., on the basis of suitability for the intended use (i.e., for obtaining certain reaction temperature within the riser product conduit) and absent showing any unexpected results thereof, since it is known in the art to distribute quenching means along the length of a catalytic cracking riser reactor in order to

achieve a desired riser reactor temperature profile for maintaining desired product yields, as taught by Goelzer et al. (column 8, lines 27-40; column 11, lines 4-40; column 12, lines 1-43). In any event, shifting location of parts was held to have been obvious. *In re Japikse,* 181 F.2d 1019, 1023, 86 USPQ 70, 73 (CCPA 1950), and where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, *In re Aller, 105 USPQ 233.*

11. Claims 1-6 and 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weinberg et al. (U.S. 5,196,172).

With respect to claims 1, 2, 5 and 8, the same comments with respect to Weinberg et al. apply. Although Weinberg et al. appear to disclose *by illustration* a ratio of *y*:*x* from about 1.1:1 to 5.0:1, or about 1.25:1 to 2.5:1, and a riser product conduit having a radius of approximately *x*, Weinberg et al. are silent as to explicitly disclosing the recited ranges or dimensions. In any event, it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to select an appropriate range for the ratio of *y*:*x* in the apparatus of Weinberg et al., on the basis of suitability for the intended use and absent showing any unexpected results thereof, since it has been held that changes in size involve only ordinary skill in the art. *In re Rose,* 220 F.2d 459, 463, 105 USPQ 237, 240 (CCPA 1955), and where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, *In re Aller, 105 USPQ 233.*

With respect to claims 3, 4 and 6, the same comments with respect to Weinberg et al. apply. Although Weinberg et al. appear to disclose *by illustration* an angle ranging from about 5° to 30°, or about 8° to 20° for the first diameter transition section, and an angle ranging from

about 5° to about 30° for the second diameter transition section, Weinberg et al. are silent as to explicitly disclosing the recited ranges. In any event, it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to select an appropriate range for the respective angles in the apparatus of Weinberg et al., on the basis of suitability for the intended use and absent showing any unexpected results thereof, since it has been held that changes in size involve only ordinary skill in the art. *In re Rose*, 220 F.2d 459, 463, 105 USPQ 237, 240 (CCPA 1955), and where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, *In re Aller, 105 USPQ 233*.

With respect to claims 8-10, the same comments with respect to Weinberg et al. apply.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Gartside and Herbst are provided to illustrate the general state of the art.

* * *

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Leung whose telephone number is 703-305-4951. The examiner can normally be reached on 8:30 am - 5:30 pm M-F, every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on 703-308-6824. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Jennifer A. Leung
June 5, 2003

HIEN TRAN
PRIMARY EXAMINER